This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously presented) An electrochemical cassette comprising at least one electrochemical cell which comprises:
a membrane electrode assembly (MEA), a reductant flow field, an oxidant flow field, a separator plate, at least one reductant external manifold and at least one oxidant external manifold, wherein each flow field comprises at least one opening extending through the periphery of the cell and each external manifold comprises a primary manifold and at least one port capable of coupling to the peripheral openings in the flow field to which the external manifold is intended to deliver material,
wherein the MEA, oxidant flow field, reductant flow field, separator plate, the at least one oxidant external manifold, and the at least one reductant external manifold are assembled and encapsulated about the periphery thereof by a sealant.

2. (Original) The electrochemical cassette of claim 1, wherein each external manifold comprises a primary manifold which consists of a single conduit having a substantially uniform cross section along the length thereof.

3. (Original) The electrochemical cassette of claim 1, wherein each reductant external manifold and each oxidant external manifold comprises at least one port capable of mating to peripheral openings of an equal number of flow fields to which the manifold is intended to deliver or remove material.

4. (Original) The electrochemical cassette of claim 1, wherein each reductant external manifold and each oxidant external manifold comprises at least two ports capable of mating to peripheral openings of an equal number of flow fields to which the manifold is intended to deliver or remove material.

5. (Original) The electrochemical cassette of claim 1, wherein each reductant external manifold and each oxidant external manifold comprises between 2 and 100 ports capable of mating to peripheral openings of an equal number of flow fields to which the manifold is intended to deliver or remove material.

6. (Original) The electrochemical cassette of claim 3, wherein each port of the external manifold are arranged in a substantially linear array.

7. (Currently amended) The electrochemical cassette of claim 1, wherein each reductant external manifold and each oxidant external manifold comprises a single article having a substantially homogenous composition, wherein each manifold comprises the primary manifold and at least two ports capable of mating to peripheral openings of an equal number of flow fields to which the manifold is intended to deliver or remove material.

8. (Original) The electrochemical cassette of claim 1, wherein the sealant contemporaneously seals the junction between the ports of the external manifolds and the peripheral openings of the flow fields to which the manifold is intended to deliver a material during the encapsulation process.

9. (Previously presented) The electrochemical cassette of claim 1, wherein each MEA and each separator plate comprises no grooves, holes or other aperture extending through the entire thickness thereof.

10. (Original) The electrochemical cassette of claim 1, wherein cassette further comprises at least one coolant flow field wherein each coolant flow field comprises at least two openings extending through the periphery of the flow field and at least two coolant external manifolds each comprising a primary manifold and at least one port capable of coupling to the peripheral openings in the coolant flow field.

11. (Original) The electrochemical cassette of claim 10, wherein each reductant external manifold and each oxidant external manifold comprises a single component comprising the primary manifold conduit and at least two ports capable of mating with peripheral openings of an equal number of flow fields to which the manifold is intended to deliver material; and each coolant external manifold opening comprises a single component comprising the primary manifold conduit and at least one port capable of mating to peripheral openings of an equal number of coolant flow fields.

12. (Original) The electrochemical cassette of claim 1, wherein each external manifold comprises at least two primary manifolds and at least two sets of ports which are not fluidly connected such that each primary manifold and each set of ports can deliver or remove material to flow fields to which each primary manifold is intended to deliver or remove material.

13. (Original) The electrochemical cassette of claim 1, wherein a separator plate and one or two flow fields are integrated into a bipolar plate and each flow field peripheral opening extends through only a portion of the thickness of the bipolar plate.

14. (Original) The electrochemical cassette of claim 13, wherein cassette further comprises at least one coolant flow field wherein each coolant flow field comprises at least two openings extending through the periphery of the flow field and at least two coolant external

manifolds each comprising a primary manifold and at least one port capable of coupling to the peripheral openings in the coolant flow field.

15. (Original) The electrochemical cassette of claim 14, wherein each bipolar plate has zero or one oxidant flow field, has zero or one fuel flow field, and zero or one coolant flow field.

16. (Original) The electrochemical cassette of claim 1, wherein each membrane electrode assembly is in contact with a fuel flow field and an oxidant flow field.

17. (Original) The electrochemical cassette according to any one of claims 1 through 15, wherein the electrochemical cassette is a fuel cell cassette.

18. (Original) The electrochemical cassette according to claim 14, wherein at least one bipolar plate comprises a coolant flow field.

19. (Original) The electrochemical cassette of claim 18, wherein a first bipolar plate comprises a first coolant flow field and a second bipolar plate which are aligned to form a coolant passage.

20. (Original) The electrochemical cassette of claim 1, wherein the external manifold is composed of a primary manifold and a plurality of ports disposed along the length thereof wherein the ports are aligned such that they form fluid tight seals with a plurality of peripheral openings in the flow fields which correspond to flow fields to which the external manifold is intended to deliver material.

21. (Original) The electrochemical cassette of claim 20 wherein the external manifold is machined from a resin, ceramic or metal, cast or molded from a thermoplastic or thermoset resin, or manufactured from a plurality of plastic or rubber tubing.

22. (Original) The electrochemical cassette of claim 21, wherein the external manifold is machined, cast, or molded from a thermoplastic or thermoset resin or manufactured from plastic or rubber tubing.

23. (Original) The electrochemical cassette of claim 22, wherein the external manifold is machined, cast, or molded from a thermoplastic material is selected from the group consisting of thermoplastic olefin elastomers, thermoplastic polyurethane, plastomer, polypropylene, polyethylene, polytetrafluoroethylene, fluorinated polypropylene and polystyrene.

24. (Original) The electrochemical cassette of claim 22, wherein the external manifold is machined, cast, or molded from a thermoset material is selected from the group consisting of epoxy resins, urethanes, silicones, fluorosilicones, and vinyl esters.

25. (Currently amended) The electrochemical cassette of claim 22, wherein the external manifold is manufactured from tubing, hosing or piping selected from silicone, ~~TYGON (polyvinyl chloride (PVC)~~, butyl rubber, poly(isoprene), copolymers of styrene and isoprene.

26. (Original) The electrochemical cassette of claim 13, wherein the bipolar plate is machined or molded out of at least one of a carbon/polymer composite, graphite or metal.

27. (Original) The electrochemical cassette of claim 13, wherein the bipolar plate is stamped from a metal sheet.

28. (Original) The electrochemical cassette of claim 1, wherein the sealant is introduced by pressure assisted resin transfer, by vacuum assisted resin transfer, or by injection molding.

29. (Original) The electrochemical cassette of claim 28, wherein the sealant or resin is introduced under a pressure differential of between about +15psi and about –15psi.

30. (Original) The electrochemical cassette of claim 28, wherein the sealant is introduced by pressure assisted resin transfer under a positive pressure of between 0 psi and about 500 psi.

31. (Original) The electrochemical cassette of claim 28, wherein the sealant or resin is introduced by vacuum assisted resin transfer under a partial pressure of between about 750 Torr and about 1 mTorr.

32. (Previously presented) A fuel cell stack comprising:

(a) at least one electrochemical cassette according to claim 1;

(b) at least one end plate;

wherein the end plate is assembled on the top and/or bottom of the stack of one or more electrochemical cassettes.

33. (Original) The fuel cell stack of claim 32, wherein the end plate is assembled with the electrochemical cassette(s) prior to encapsulation such that the end plate and fuel cell cassettes(s) are encapsulated and sealed in combination.

34. (Original) The fuel cell stack of claim 32, wherein a compression means is applied to the stack to provide compressive force to the fuel cell stack.

35. (Original) The fuel cell stack of claim 32, wherein the end plate is attached to one or more electrochemical cassettes after encapsulation of the electrochemical cassette(s).

36. (Original) The fuel cell stack of claim 35, wherein the end plate is attached by a compressive seal.

37. (Original) The fuel cell stack of claim 32, wherein at least one of the end plates is composed of a thermoset polymer, a thermoplastic polymer, a metal, or a metal alloy.

38. (Original) The fuel cell stack of claim 32, wherein at least one of the end plates is composed of a filled polymer composite.

39. (Original) The fuel cell stack of claim 38, wherein the filled polymer composite is a glass fiber reinforced thermoplastic or a graphite reinforced thermoplastic.

40. (Original) The fuel cell stack of claim 32, wherein at least a portion of one of the end plates is composed of an electrically conductive metal or metal alloy.

41. (Original) The fuel cell stack of claim 40, wherein at least a portion of one of the end plates is a copper current collector.

42. (Previously presented) The electrochemical cassette of claim 1, wherein the membrane electrode assembly is a composite MEA.